

PRICE
15¢

TECHNOLOGY DEPT.

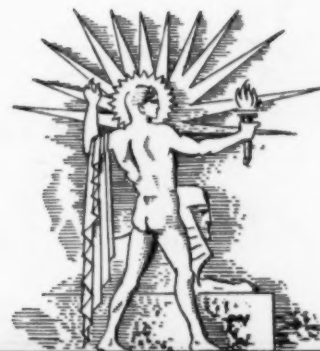
PUBLIC LIBRARY

NOV 25 1939

DETROIT

SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE •



November 25, 1939

Rare Creatures of the Night

See Page 345

A SCIENCE SERVICE PUBLICATION

Do You Know?

Newly-hatched quail are scarcely more than an inch long.

Conies that live in the High Sierras have been called excellent ventriloquists.

Peru has no rush marketing season for cotton, because cotton is being picked in some part of Peru at almost any time of the year.

A Russian scientist found that when people in speech experiments were asked not to make gestures they spoke less clearly and fluently.

Night driving is not recommended in many parts of Africa because wild animals congregate on the roads and it is hard to shoot them off.

Many a cancer death is really suicide, says a physician, pointing out that patients may die needlessly by following ignorant or quack treatment.

Invited by the Chinese government, three U. S. Public Health Service scientists have gone to study disease control problems near the Burma border.

The biggest North American bird, the California condor, is about 5,000 times as large in bulk as the calliope humming bird, which is America's smallest.

The Great Wall of China, built in the third century B.C., was equipped with a crude forerunner of telephone communication, in the form of brass tubes between guard stations.

QUESTIONS DISCUSSED IN THIS ISSUE

Most articles which appear in SCIENCE NEWS LETTER are based on communications to Science Service, or on papers before meetings. Where published sources are used they are referred to in the article.

ASTRONOMY

What was the "Star of Bethlehem"? p. 346.

BACTERIOLOGY

How can babies in a hospital be kept safe from infection? p. 348.

CHEMISTRY

What nation is best able to produce explosives? p. 341.

CHEMISTRY—AERONAUTICS

What discovery made possible the large-scale production of super aviation gasoline? p. 342.

GENERAL SCIENCE

How does metrazol perform its mental healing? p. 339.

What is the difference between a horse and a whale? p. 340.

What plan have scientists made for a post-war world? p. 350.

What sort of problems will British scientists be asked to solve? p. 361.

Why did the war gas arsine cause anemia? p. 339.

GEOLOGY

What happened to Poland's oil fields? p. 344.

MEDICINE

How is radium protected against air raids in London? p. 344.

PHYSIOLOGY

How is a rabbit's ear aiding the study of silicosis? p. 343.

PSYCHIATRY

What city has an adult guidance clinic? p. 345.

PSYCHOLOGY—MILITARY SCIENCE

How did America distribute propaganda in Germany during the World War? p. 340.

RADIO

How can an airplane military observer deliver his map to headquarters without landing? p. 341.

Physicians can draw on 100,000 drugs in compounding prescriptions.

A recently found manual of arithmetic by a seventh century Armenian scientist contains an appendix of riddles.

Britain's war emergency farm program calls for cultivating an additional 2,000,000 acres of farmland before the end of 1939.

The forest area of Sweden is about the size of that in Wisconsin, Michigan, and Minnesota; but Swedish timber stands are almost twice as thick.

There are about as many calories in an orange as in a cantaloupe—100 in each.

European chemists have evolved several chemical methods of treating fabrics in the quest for an ideal means of making goods crease-resistant.

Methods developed at a New York State Agricultural Experiment Station have enabled ice cream manufacturers to use visible pieces of fruit in ice cream without danger of the fruit freezing hard: soaking the sliced fruit in sugar before freezing does it.

SCIENCE NEWS LETTER

Vol. 36 NOVEMBER 25, 1939 No. 22

The Weekly Summary of Current Science, published every Saturday by SCIENCE SERVICE, Inc., 2101 Constitution Avenue, Washington, D. C. Edited by WATSON DAVIS.

Subscriptions—\$5.00 a year; two years \$7.00; 15 cents a copy. Ten or more copies to same address, 5 cents a copy. Back numbers more than six months old, 25 cents.

In requesting change of address, please give your old address as well as the new one, at least two weeks before change is to become effective.

Copyright, 1939, by Science Service, Inc. Reproduction of any portion of SCIENCE NEWS LETTER is strictly prohibited. Newspapers, magazines and other publications are invited to avail themselves of the numerous syndicate services issued by Science Service.

Cable address: Scienserv, Washington.

Entered as second class matter at the post-

office at Washington, D. C., under the Act of March 3, 1879. Established in mimeographed form March 18, 1922. Title registered as trademark, U. S. and Canadian Patent Offices. Indexed in Readers' Guide to Periodical Literature, Abridged Guide, and in the Engineering Index.

Members of the American Association for the Advancement of Science have privilege of subscribing to SCIENCE NEWS LETTER at \$3 a year.

The New York Museum of Science and Industry has elected SCIENCE NEWS LETTER as its official publication to be received by its members.

Advertising rates on application. Member Audit Bureau of Circulation.

SCIENCE SERVICE is the Institution for the Popularization of Science organized 1921 as a non-profit corporation, with trustees nominated by the National Academy of Sciences, the National Research Council, the American Association for the Advancement of Science, the E. W. Scripps Estate and Journalistic profession.

Board of Trustees—Honorary President: William E. Ritter, University of California. Representing the American Association for the Advancement of Science: J. McKeen Cattell, Edi-

tor, Science; Henry B. Ward, University of Illinois; Edwin G. Conklin, President, American Philosophical Society. Representing the National Academy of Sciences: W. H. Howell, Vice-President and Chairman of Executive Committee, Johns Hopkins University; R. A. Millikan, California Institute of Technology; Harlow Shapley, Harvard College Observatory. Representing National Research Council: C. G. Abbot, Secretary, Smithsonian Institution; Harrison E. Howe, Editor, Industrial and Engineering Chemistry; Ross G. Harrison, Yale University. Representing Journalistic Profession: John H. Finley, Editor, New York Times; J. Edwin Murphy, Managing Editor, Baltimore Evening Sun; O. W. Riegel, Washington and Lee School of Journalism. Representing E. W. Scripps Estate: Harry L. Smithton, Treasurer, Cincinnati, Ohio; Warren S. Thompson, Miami University, Oxford, Ohio; W. W. Hawkins, Scripps Howard Newspapers.

Staff—Director, Watson Davis; Writers, Frank Thone, Emily C. Davis, Jane Stafford, Marjorie Van de Water, Robert Potter; Correspondents in principal cities and centers of research. Photography: Fremont Davis; Librarian: Minna Gill; Sales and Advertising: Hallie Jenkins, Austin Winant, Howard Bandy.

GENERAL SCIENCE

Metrazol Treatments Cure By "New Deal of Nerve Ends"

Some of Old Nerve Endings and Junctions in Sick Brains Are So Injured by Drug That They Are Replaced

DISCOVERY that metrazol "cures" sufferers from the usually hopeless mental disease, schizophrenia or dementia precox, by bringing about "a new deal of nerve endings" within the brain was announced by Dr. Carl C. Speidel, University of Virginia anatomy professor, at the meeting of the American Philosophical Society in Philadelphia.

Hundreds of mentally sick patients, doomed to a lifetime in the unreal world of the insane, have been shocked back to sanity and restored to normal life by metrazol treatments, since their introduction by Dr. Laszlo von Meduna of Budapest, Hungary. Scientists, however, have so far had no exact explanation of how the drastic treatment achieved its spectacular results.

What happens, it now appears from Dr. Speidel's investigations, is that some of the old nerve endings and junctions in the sick brains are so injured by the metrazol that they degenerate and are lost. New, healthy nerve endings and junctions then grow to replace the ones lost by degeneration. As a result of this new deal in nerve endings in the brain, the patient is equipped with brain nerves that can carry on mental functions in a normal manner.

Dr. Speidel's discovery of the new deal in nerve endings following the metrazol shock treatment was made by giving mild, moderate and severe metrazol treatments to frog tadpoles and watching the effects on the nerves of these tiny animals. Such observations cannot be made of the nerves in the sick brains of human patients, but Dr. Speidel has perfected a technic for observing directly under the microscope the living nerves of frog tadpoles as they grow and as they regenerate after injury.

When metrazol treatments were given the tadpoles, Dr. Speidel saw typical changes of irritation and injury take place in their nerves. Variable lengths of the nerve endings were lost by degeneration and in extreme cases a whole cluster of nerve endings was lost.

Slightly injured nerve fibers recovered quickly after the treatment and appeared

to be normal after a day or two. Severely injured nerve fibers which lost appreciable lengths of nerve substance by degeneration underwent the typical stages of regeneration.

"New endings grow out to establish connections which are different from those before metrazol treatment," Dr. Speidel reported.

"In other words, the metrazol treatment has brought about a 'new deal' of nerve endings.

"These observations strongly suggest that similar changes probably take place in nerve endings located within the brain at the synapses between nerve cells. On this basis the improvement in human mental conditions after metrazol injections is correlated with the breaking down of some of the old nerve endings and synapses, and the establishment of new ones."

Science News Letter, November 25, 1939

Totalitarianism Examined

TOTALITARIAN theories of war and education were put on the dissecting table by Prof. Walter Thomas Woody of the University of Pennsylvania and Prof. Hans Kohn of Smith College.

The totalitarian powers actually invert the war philosophy of Clausewitz, favorite philosopher of militarists, Prof. Kohn pointed out. Clausewitz held that war was a continuation of politics by other means, and the hard-boiled old realist Bismarck agreed with him and acted on the principle.

Totalitarians, however, go far beyond that "blood-and-iron" doctrine. They regard war, not peace, as the normal state of nations; with them politics is a continuation of war, "while what is called peace is only a pause between the real events, preparing for them, subservient to them."

Prof. Woody, taking up the question of education in totalitarian states, sees them pursuing a policy equally hostile to "the universalism which sought to unify Europe in the Middle Ages and the liberal educational principles that stemmed

from early rationalism and from naturalism of the eighteenth and nineteenth centuries."

This would appear to explain the simultaneous attacks, conducted in all totalitarian countries, against organized religion on the one hand, and on the other against freedom of speech, freedom of the press, and academic freedom in the universities.

Science News Letter, November 25, 1939

War Gas Anemias Explained

THE ACUTE anemias that follow gassing with arsine, treatment with the new chemical remedy, sulfanilamide, and the anemia that accompanies jaundice of the newborn, one form of heart disease, and numerous other conditions, have been explained by discoveries reported by Drs. Thomas Hale Ham and William B. Castle, of Boston City Hospital and Harvard Medical School.

Stagnation of blood within the veins is believed to be the mechanism that causes the anemia, their studies show. This condition makes the red blood cells swell, grow fragile and finally disintegrate with loss of the red coloring matter, hemoglobin. Such stagnation of the blood normally occurs in the spleen and



X-RAY HEART BEAT

This 100,000-volt X-ray camera works automatically with nine electrical relays which make up its mechanical "brain." At its formal dedication at the Samaritan Hospital, Troy, N. Y., the visitor is having his heartbeat photographed.

other organs, but not in the veins. The function of the spleen in slowing the blood flow accounts for the beneficial effect of removing the spleen in congenital hemolytic jaundice, Drs. Ham and Castle pointed out.

Science News Letter, November 25, 1939

Religion Began With Sex

CAVE men and women in the Old Stone Age were worshippers of physical sex, it was declared in a paper offered to the Society by Prof. George A. Barton of the University of Pennsylvania. To these remote forebears of ours, sex was a religious as well as an emotional and a physical experience. Its expressions were extremely naive and direct; the complex structure of symbolisms and cults grew up much later, out of the original soil of cruder facts.

Science News Letter, November 25, 1939

Early Man in Burma

HUMAN beings on the same low level as Peking Man in China existed far to the south, in Burma, during the Ice Age, declared Dr. Helmut de Terra, noted explorer of ancient human sites in Asia. No skulls or other actual remains of this ancient race have yet been found, but the type of stone tools found "is so primitive as to suggest a low grade intelligence corresponding to the crude mental status of Peking Man . . . This type of Stone Age culture has its parallels in northern India, in China as well as in Java so that a center of dispersal may be surmised in southeastern Asia from which the most ancient technique of tool making was spread to various lands."

Science News Letter, November 25, 1939

New Theory of Diabetes

NEW knowledge of body chemistry in diabetes which contradicts previously held theories was reported by Drs. William C. Stadie, John A. Zapp and Francis D. W. Lukens, of the University of Pennsylvania.

"Over-production of sugar from fats is not the mechanism responsible for the excessive excretion of sugar in the diabetic," they conclude from their studies of chemical action in the liver of the diabetic animal.

Ketone bodies, chemicals produced when the body's chemical factory is upset by diabetes, have formerly been considered poisonous waste-products which the tissues could not use and which were

consequently excreted completely. This idea also needs "considerable revision," the Pennsylvania scientists found, as does the current theory of how fatty acids are burned and oxidized in the liver.

Science News Letter, November 25, 1939

Horse and Whale Compared

HORSE and whale were compared, as mechanisms for the release of energy, by Drs. George Crile and D. P. Quiring of the Cleveland Clinic Foundation. The horse was Equipoise, one of the most famous thoroughbreds of this generation. The whale was a white whale, representing a rather small species as whales go—average length, only 12 to 14 feet. The particular specimen examined was of almost exactly the same weight as Equipoise, both animals being a trifle under 1150 pounds.

The points that interested Drs. Crile and Quiring were the relative weights of four organs having most to do with energy release: brain, heart, thyroid and adrenal glands.

The whale's brain weight was nearly three times that of the horse's: 2355 grams as against 808.5. Its thyroid gland likewise was about three times heavier than the horse's: 108 grams as against 33.4.

The horse surpassed the white whale in weight of heart and adrenal glands: heart, 4455 grams as compared with 3181; adrenals, 46.62 grams as compared with 34.76.

Science News Letter, November 25, 1939

Growth Produces Cheer

IF THE population curve continues its present downward dive, the world is in for an age of pessimism, affecting everything from politics to religion. At least, this is what will happen if history repeats itself.

Prof. Josiah C. Russell of the University of North Carolina presented results of his studies of the general attitude and atmosphere in three great historic periods, one a time of declining population in Europe, from 200 to 900 A.D.; the second, the period of increasing population in England from 1086 to 1348; finally, the time of growth of the United States from 1789 to 1914.

In the great period of falling population, Prof. Russell found, people became pessimistic, paid less and less attention to material culture, and took refuge in religion, while the political organization became smaller and progressively decentralized, winding up in feudalism.

In the periods of rising population, on the other hand, people were optimistic, had "progressive" ideas, moved to big towns, concerned themselves less and less about religion, built increasingly large and complex political states, and generously credited "the government" with their prosperity.

Science News Letter, November 25, 1939

Maya Temple Bases Complex

PYRAMID is too simple a name for some of the complex and lofty bases on which Indians of America's Old Mayan Empire set their beautiful temples, declared Linton Satterthwaite, Jr., of the University Museum, University of Pennsylvania.

At Piedras Negras, Guatemala, where he has been excavating, a temple may have beneath it, from the ground up, a basal platform, a pyramid, a supplementary platform and a foundation platform. On the first three the Indians probably staged outdoor ceremonies connected with the temple rites, he suspects.

Science News Letter, November 25, 1939

PSYCHOLOGY—MILITARY SCIENCE

Propaganda Balloons Used in World War, Too

BRITISH, dropping leaflets from airplanes, and Germans sending propaganda balloons over enemy territory are only following tactics developed to a high peak of efficiency during the World War by our own American Creel Committee.

Leaflets were then distributed to the Germans, at a cost of only a dollar a thousand, in balloons nine feet in diameter that carried 10,000 such messages and released them at the rate of 12 to 24 a minute, exploding when the errand was accomplished.

But balloons were not the only agency for distributing propaganda behind enemy lines, it is revealed in the new book on the Creel Committee's work by James R. Mock and Cedric Larson, *Words That Won the War*.

"The methods of trench propaganda included not only airplanes and balloons," reports this new document, "but also devices for shooting leaflets into the German lines—rifle grenades, rockets, and mortars."

"The difficulty here was that enemy artillery promptly brought reprisals against the sector from which the propaganda had come—which is as impressive testimony as may be presented that the Germans held the paper bullets in higher respect than those of metal."

"Gibson wrote Irwin from Paris on April 17 of a way around this difficulty. 'There is a new plan to use Seventy-Fives which can be fired at the same time along a wide front, and in this way reprisals will be prevented. For this method special shells will have to be prepared, so it cannot be put into effect immediately. The shell is designed to carry a package of small pamphlets or tracts, and the explosion spreads them in a radius of several kilometers behind the lines.'"

Science News Letter, November 25, 1939

CHEMISTRY

New Gas-Oil Explosives Would Help U. S. in War

THE United States is better able to produce explosives than any other nation on earth. It has raw materials in abundance, the chemical industrial organization to secure large production and the transportation to put them where they are needed.

It is significant that this appraisal comes from the head of the Austro-Hungarian munitions industry during the World War, Prof. Ernst Berl, now research professor at the Carnegie Institute of Technology, Pittsburgh, and an American citizen. Surveying America's capacity to produce explosives, Prof. Berl in the technical journal, *Chemical and Metallurgical Engineering*, emphasizes that chemical advances make it possible to produce military explosives from raw materials not used for explosives manufacture in the last war.

From natural gas, from crude oil, by fermentation of carbohydrates, from sugars, from bituminous coals, there can be made explosives with unfamiliar names that are quite as devastating as TNT.

For instance, methane in natural gas can be converted into acetylene and into methanol (wood alcohol); formaldehyde can be made direct from methane or from methanol; acetaldehyde can be obtained from acetylene; combine acetaldehyde and formaldehyde, nitrate the product and there results pentaerythritetranitrate, one of the most important newer explosives.

TNT can be made from aromatics extracted from petroleum as well as from the coking of soft coal. And in dozens of other ways the newer chemical methods, primarily developed to promote better living in a peaceful world, can contribute to explosives for use in war.

Science News Letter, November 25, 1939

RADIO

Two-Way Facsimile Unit Developed For Aviation

Observer Can Spot Information on Map and Transmit; Secrecy Can Be Insured By Any Scrambling Method

A PICTURE of streamlined action in military reconnaissance through the use of new two-way facsimile communication has been demonstrated by W. G. H. Finch, communications engineer, before Army and Navy officials.

With the little 25-pound unit in an observation plane over the enemy lines it is possible to transmit back, immediately, to every battery at the front the location of troop concentrations, gun emplacements and other vital military intelligence.

The reconnaissance pilot merely takes along a prepared map of the region and marks on it the information discovered. This portion of the map is placed in the transmitting scanning unit and, in an instant, it appears at every battery which can reach the objective by gunfire.

By present methods the plane must fly back and drop messages over the lines or else take photographs and return to its base. The developed prints are then rushed to headquarters and then all batteries must be notified from G.H.Q.

Complete secrecy for the facsimile transmitting system can be obtained by any of the present "scrambled" radio methods which present a hodge-podge of signals to a receiver that might intercept the messages, but which is automatically decoded properly in the pre-arranged facsimile receivers.

Even "radio barrage"—the jamming of distorting signals on the same wavelength—has little effect on facsimile transmission, Mr. Finch said in an interview. This deliberate distortion has been tried experimentally. While it grays in the background it does not usually prevent the arrival of the intelligence superimposed upon it.

Tests on the *U.S.S. Fanning*, at sea, were made with the device in which a diagram of an engine part was received on shipboard at the same time that the ship's transmitters were trying to "jam" the signals by transmitting on the same wavelength. The diagrams came through and were legible.

While this military application has interest at the moment, it is really only one small aspect of the peacetime uses of facsimile which will be augmented by the new two-way unit.

Police departments are putting facsimile receivers into their squad cars and obtaining permanent written instructions for patrolmen. Where before officers could claim that they did not receive a message because of "dead spots" in a city, the facsimile receiver indicates such areas clearly. If a patrolman leaves his car and fails to hear a message the new facsimile brings him a permanent message on his return. Photographs of wanted criminals, and fingerprints also, can be transmitted swiftly.

For aviation, charts of data, weather maps and any information that can be put on a piece of paper can be winged swiftly by the mobile two-way units. Earphones can be used solely for radio beam signals and the co-pilot's duties as radio operator can be greatly diminished.

For ships at sea, navigational data and all other types of intelligence can be



SCIENCE AID TO POLICE

With this new facsimile instrument the policeman cruising in his radio scout car can actually see the picture of the man he is hunting.

transmitted. Just before the present European war broke out, plans were under way for ships' newspapers printed by facsimile from shore transmitters.

Nineteen radio stations throughout the country are now sending home "radio newspapers" during the early morning hours into more than 5,000 homes which now have low-cost facsimile receivers. In one Midwestern city, home correspondence courses for farmers are being made available.

Great newspaper syndicates are daily transmitting pictures across the oceans and the continent and bringing news photos to the front pages simultaneously with the written stories about them.

The fact that facsimile can be sent by telegraph or telephone wire, or by radio, gives it an enormous range of usefulness. Straight printed messages in six-point type can be transmitted at the rate of 300 words per minute. This is four times as fast as teletype, says Mr. Finch.

Science News Letter, November 25, 1939

CHEMISTRY

1938 Nobel Prize Given For Research on Vitamins

THE NOBEL PRIZE in chemistry for 1938, withheld last year, has now been awarded to Prof. Richard Kuhn, of the Kaiser Wilhelm Institute of Berlin, for his researches on vitamins and carotenoids. His investigations were made on the relation between carotene, the yellow coloring matter of butter and of vegetables such as carrots, and vitamin A.

Science News Letter, November 25, 1939

The population of the world is believed to have more than doubled since 1800.

Government scientists have produced a new non-crystallizing rosin, which may prove valuable in manufacture of paint and varnish.

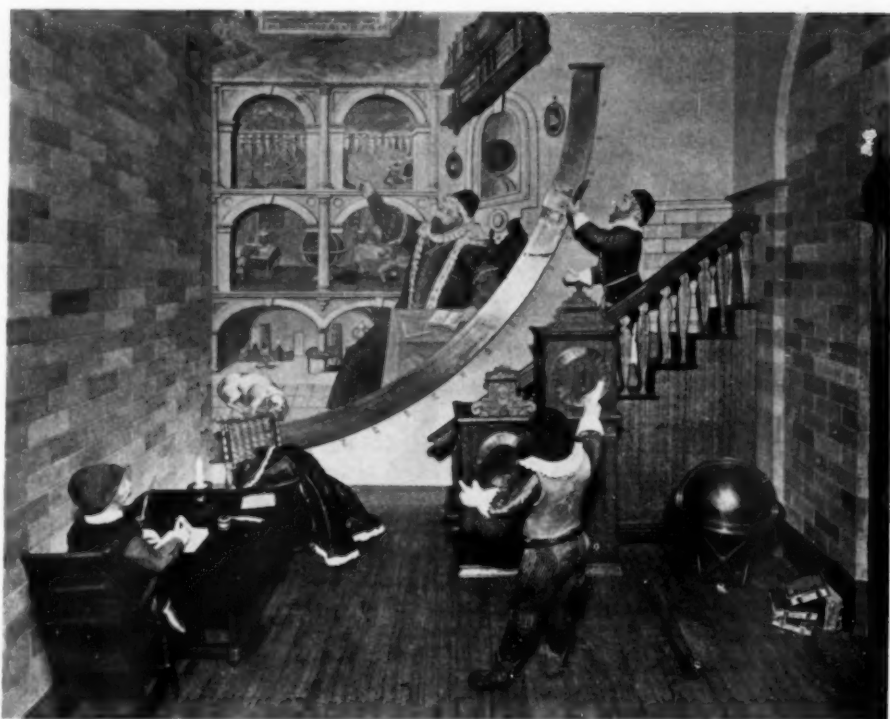
Don't Delay

getting that new book you want to read. SCIENCE NEWS LETTER will gladly obtain for you any American book or magazine in print. Send check or money order covering regular retail price (\$5 if price is unknown, change to be returned) and we will pay postage in the United States. When publications are free, send 10c for handling. Address:

Book Department

SCIENCE NEWS LETTER

2101 Constitution Ave. Washington, D. C.



WORKING EXHIBIT

In this diorama at the Buhl Museum, showing the observatory in Denmark of Tycho Brahe, the little men respond to the visitor's button pushing by going through the motions of making astronomical calculations in the way they were done before the days of telescopes. (See facing page)

CHEMISTRY—AERONAUTICS

Combine Research To Produce Vast Amount of Super Gas

Anti-Knock Fuel Can Be Made Directly From Paraffin And Olefins, Using Sulfuric Acid as a Catalyst

DISCLOSURE of new methods for producing vast quantities of 100-octane, super-aviation gasolines by the use of widely available sulfuric acid as a chemical catalyst, was reported to the meeting of the American Petroleum Institute in Chicago in a joint announcement of five leading oil companies.

Super fuels for aircraft—having anti-knock ratings of 100-octane—have rapidly increased in use. Some 7,000,000 gallons were used in 1937. By 1938 the amount had risen to 20,000,000 gallons and 1939 and 1940 use is anticipated to be much greater.

The assurance of a larger quantity of this vital and precious fuel for airplanes, at a reasonable price, comes with

the new announcement of large scale operations by the Anglo-Iranian Oil Company, Humble Oil and Refining Company, Shell Development Company, Standard Oil Development Company, and the Texas Company.

What has made possible the operation of the six refining plants by these companies, says the report, is the discovery that an 85-octane gasoline (which with the addition of a small amount of tetraethyl lead becomes 100-octane fuel) can be made directly from paraffin and olefins, using sulfuric acid as a catalyst. Sulfuric acid is widely available and its use represents a major advance on a commercial scale, says the report.

The new development combines the

independent results of the research staffs of the five oil companies.

"These groups, working independently, had developed processes which, though somewhat different in details of operation and in the results obtained, were in principle essentially similar. In the best interest of the petroleum indus-

try as a whole, and in order that a major new source of high-octane aviation fuel should be made available for national defense without delay or waste of correlative experience, their efforts recently have been combined to expedite the commercial application of the process."

Science News Letter, November 25, 1939

PHYSIOLOGY

Window on Rabbit's Ear Aids Study of Dust in Silicosis

Microscopic Observation Reveals What Happens To Living Cells When Silica is Imbedded

MEDICAL scientists are now attacking the problem of silicosis, dread miner's disease, by attaching a small transparent "window" to the ears of rabbits, it was reported to the meeting of the Air Hygiene Foundation in Pittsburgh by Dr. Eliot R. Clark, professor of anatomy, and Darrow E. Haagenen of the University of Pennsylvania.

A tiny sterile microscope viewing window, designed by Dr. R. G. Williams, associate professor of anatomy at the University of Pennsylvania, was attached last April to a rabbit's ear. Inside is a

space only $1/333$ of an inch thick in which the tissue of the ear could grow normally.

Last June minute specks of silica ranging in size from one to seven microns (a micron is $1/25,000$ of an inch) were placed on the tissue. A few particles up to 30 microns were also present. The cover was then placed over the microscope chamber and scientists daily have been photographing and drawing the tissue cells as they sought to live in the same environment with the silica.

While the important research must be

continued much longer before final conclusions can be determined, it already appears that:

1. A relatively stationary grouping has developed among living cells called macrophages which have ingested, or taken in, the smaller particles of silica.

2. The silica laden cells tend to be very sluggish but seem to move slightly from day to day. They show grouping tendencies with occasional slow scattering and regrouping. Some of the larger particles from 15 microns and up in size appear to lie outside the cells and are not influenced by the tissue fluids.

3. Connective tissue has grown into the chamber and completely covered the observational area. As far as can be determined the lymphatic capillaries are normal as is the rich blood vessel plexus. Not even a mild inflammatory condition has appeared.

In another separate report Dr. Clark described the history of the use of observational "windows" placed over living tissues and showed that the tail of the tadpole, the bat's wing, and the web of the frog's foot have all been used at one time or another for research.

Science News Letter, November 25, 1939

"Worst" Size of Particles

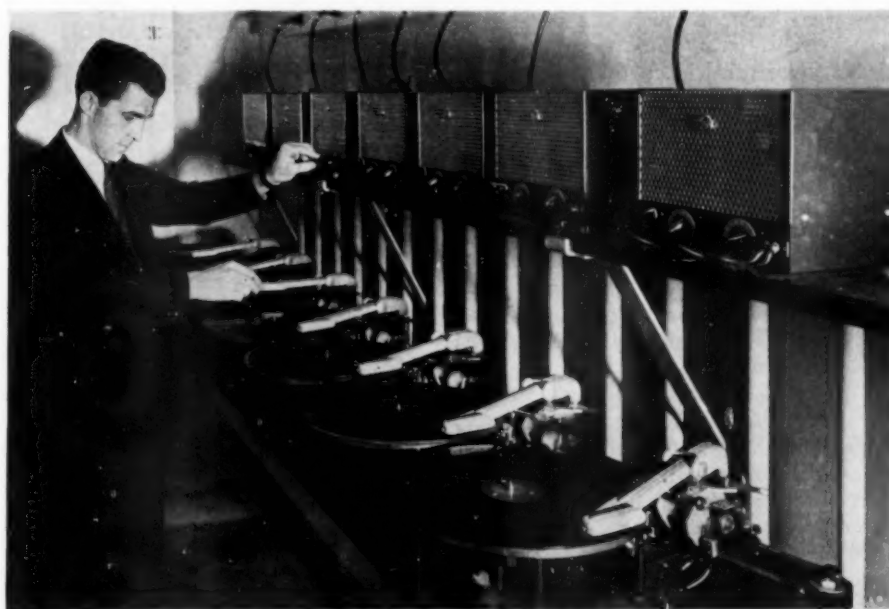
PROF. Philip Drinker of Harvard University, chairman of the Foundation's Preventive Engineering Committee, described studies seeking to learn what size of silica particles seem to have the most rapid effect in producing cell changes.

Ground flint, consisting of 99.7% silica, was carefully separated into four sizes of 3.30, 1.65, 1.04, and 0.62 microns. Sterile suspensions of these fractions were injected into ear veins of rabbits twice at three-month intervals and the animals were killed and autopsied periodically.

Examination of the liver sections indicated that the fine particles were taken up more rapidly than the larger ones. There appears to be no striking effects for the larger size particles while it seems, in these preliminary studies, that the smaller sizes produce the greatest changes.

The knowledge obtained will be useful to engineers in designing ventilation and filtering systems for mines and other places where silica dust is prevalent, and will also be of greatest use in the design of dust respirators.

Science News Letter, November 25, 1939



BEHIND THE SCENES

Here originate the voices heard by visitors as they see the exhibits in the new Buhl Planetarium and Institute of Popular Science in Pittsburgh.

Four-leaf-clover plants are marketed by an Iowa grower.

ENGINEERING

Cities Half-Lit as Japan Battles With Power Crisis

WHILE western European cities black-out at night, Japanese streets are now reduced to a half-lit dim gray, due to seriousness of the power shortage.

Reports received in the United States indicate that one of the worst droughts in Japan's history, plus the insufficient coal supply, are together straining industrial and economic projects that depend either on water or power.

Patriotic Japanese are urged to use low-wattage electric bulbs, and to discontinue use of electricity in cooking and other household tasks. Street cars and elevator services are cut. Compulsory rationing of electricity may be imposed on the public. Even the favored steel industry has had to suspend output of some materials.

Science News Letter, November 25, 1939

GEOLOGY

U. S. S. R. Gets Big Share Of Oil Fields in Poland

ACAREFUL study of the German-Russian partition of Poland by experts of the American Petroleum Institute shows that the U. S. S. R. has gained the greater share of the conquered oil fields.

When the German troops moved out of territory in East Poland, the Russian troops took over the Drohobycz area and thus gained possession of an oil district producing 3,000,000 barrels annually.

Significant from a study of who won what is the disclosure that the Drohobycz area produces 75 per cent. of all Poland's oil.

In the western district of Jaslo the Germans retained possession of a region that yields 900,000 barrels of oil annually and retained, also, a number of refineries. In refineries, American petroleum experts claim, Russia and Germany each obtained an even split of Poland's ten. Most of the idle refineries are in Germany's half of the former Polish Republic.

An independent survey of Germany's gains in conquering Poland by Karl Falk of Fresno College, Calif., who as late as 1937 was a steel expert in Upper Silesia, shows that the Reich gains amount mainly to the large and newly created industrial plants in the so-called "safety industrial triangle" around Sandomierz.

Writing in *Chemical and Metallurgical Engineering*, Mr. Falk adds that the other chief advantage to Germany is the

gain of much raw material for industry; mineral wealth which is largely unexploited. His conclusion, however, is that despite the Polish adventure Germany is still vulnerable if cut off from supplies in foodstuffs, oil and metals.

Science News Letter, November 25, 1939

CHEMISTRY

Chemical Find Permits Storage of Reserve Latex

A NEW chemical development makes possible the keeping of a reserve of liquid rubber, latex, in storage in the U.S.A. for use in time of war or interruption of the line of rubber supply stretching from British Malaya and Netherlands East Indies to our shores. A Monsanto product is sodium pentachlorophenate with a very small amount of ammonia which keeps from spoiling by disinfecting the latex more effectively than more than double the percentage of ammonia alone previously used. Latex is big business, raw material for tires and a thousand other rubber articles, 100,000,000 pounds of the liquid being shipped into U.S.A. in one year (1937).

Science News Letter, November 25, 1939

ENGINEERING

Caesium and Tellurium To Make Better Lamps

FOR THE future: Lamps at least three times as efficient as the best light sources in use today. Caesium, rare metal now used in small quantities in photoelectric cells, is at work creating light of far greater efficiency than any lamp known. Tellurium, chemical neighbor of sulfur with compounds with a garlic odor, promises to make possible a "turn-coat" lamp yielding almost exact duplicate of sunlight—a bluish light or a yellow light as desired.

Forecasters: Westinghouse lamp research engineers: Dr. J. W. Marden, Dr. N. C. Beese and George Meister speaking before Temperature Symposium of the American Institute of Physics.

Difficulties in making these lamps of the future include: Fragility of quartz which must be used to confine the vapors at extraordinary high temperatures and pressures needed for high efficiencies. Strong chemical affinity of caesium for quartz at high temperatures. Fact that tellurium vapor with enticing color differences at different temperatures yields light efficiently on direct current but not on the alternating current commonly used. The science of light making is not finished.

Science News Letter, November 25, 1939

IN SCIENCE

MEDICINE

Cancer Victims In London Receive Radium Treatment

LONDON'S Cancer Hospital has resumed radium treatment of cancer cases.

Treatment was suspended at the start of war because the radium had to be stored deep underground. It was feared that a direct hit of a bomb would scatter the radium irretrievably if not protected. Aside from the loss of the precious stuff, every person in the general neighborhood would be in danger from its piercing radiation.

The hospital, which houses the radium supply of 13 medical institutions and has therefore a hoard worth a million dollars, has bored a 50-foot shaft paralleling the shaft at the bottom of which the radium is kept. Through the second shaft, it will be possible to return the radium to safe-keeping within three minutes in the event of an air raid.

Science News Letter, November 25, 1939

PHYSIOLOGY

Tiny Adrenal Glands Help Protect Against Injury

THE TINY adrenal glands near the kidneys pour into the body extra amounts of their life-essential hormone as part of a protective mechanism against damage by injury or germ invasion, it appears from investigations reported by Drs. Paul Weil and J. S. L. Browne, of the Royal Victoria Hospital, Montreal. (*Science*, Nov. 10.)

In patients convalescing from influenza or suffering other infections and in other patients after appendicitis and other operations, an increased amount of this hormone, cortin, is excreted from the body. This, the Montreal scientists believe, is a sign that the body is responding to a damaging stimulus by producing more of the hormone.

This hormone is made in one part of the adrenal glands. Another part of the same glands makes the familiar adrenalin, which is also produced in extra amounts during emergencies to prepare the body for fight or flight in life-threatening situations.

Science News Letter, November 25, 1939

CE FIELDS

ZOOLOGY

Rare Tarsiers Thrive With Special Care at Yale

See Front Cover

SPECTRAL tarsiers, occupying a branch near the very bottom of man's ancestral tree, are also among the rarest of animals. Until recently they have never been successfully kept in captivity outside the tropics. However, the two (apparently mother and son) shown on the front cover of this week's *SCIENCE NEWS LETTER* have lived and thrived in a warm basement room at Yale University, whither they were brought from the island of Mindanao, in the Philippines, a year ago.

They don't mind living in a basement, for they are nocturnal animals, as their big, owl-like eyes indicate. All they care to eat is mealworms—live ones. Their owner, Prof. J. F. Fulton, guards their health with ultraviolet light baths, plus a few drops of codliver oil and a little salt with their mealworms. The animals are about as large as squirrels.

Science News Letter, November 25, 1939

ENGINEERING

Insulation Cuts Fuel Bill Nearly in Half, TVA Finds

ADEQUATE insulation of a house against heat loss can cut the fuel bill nearly in half, E. S. Draper, director of TVA's department of regional planning studies, reported at the meeting in New York of the Committee on Hygiene of Housing of the American Public Health Association.

Mr. Draper announced at the same time that a simple heater practical for central heating of small houses, improved after tests in a TVA house at the Gilbertsville Dam construction community, is now in production for the open market, according to the manufacturer's last report.

The insulation studies were carried out in two identical four-room houses in the Hiwassee Dam construction community. Installation of electrical heaters made it possible to record with great accuracy the heat loss in the two houses. One of them was insulated throughout by wool bats in the walls and over the

ceiling and an insulation board under the floor joists. Both houses had both doors weatherstripped. Both families were held to the same schedule of window-opening in bedrooms at night, windows closed by day, and the heaters were turned on and off at the same times. The reduction in total heat loss in the insulated house was 44.75%. Cost of insulation, including labor and materials, was about \$200.

The simple heater described by Mr. Draper was designed to effect a reduction in the capital cost of central warm air heating over that of installing the warm air furnaces then available on the market. The object was to have a primary heat source (without provision for air filtering or humidification) placed in an exceptionally small first floor heating chamber centrally located so that it might service all rooms of a small house without the usual extensive system and basement.

Science News Letter, November 25, 1939

PSYCHIATRY

Unconscious Infections Of Groups Very Dangerous

A BOOK leading the reader through strange places—almost the only unexplored frontier—the deep places of the human mind is a new translation of Carl G. Jung's *The Integration of Personality*, (Farrar and Rinehart) just published. Jung, follower of Freud but not imitator, sees in every man a dual personality, light and dark, rational and irrational, intellectual and intuitive. In an insane man, the irrational nature takes over, ideas occur to him over which he has no control. This happens occasionally to the most sane, under stress of powerful emotion.

A quote and unquote, pertinent to a disordered world:

"On such occasions, strange ideas may seize upon otherwise sound individuals. Groups and societies, even whole peoples, may have seizures of a similar kind; these are mental epidemics. In such a case only malevolent critics speak of a psychosis, while others speak of an ism. The ordinary lunatic is generally a harmless, isolated case; since everyone sees that something is wrong with him, he is quickly taken care of. But the unconscious infections of groups of so-called normal people are more subtle and far more dangerous, although they derive from the autonomy of unconscious processes just as much as does insanity."

Science News Letter, November 25, 1939

PSYCHIATRY

Adult Guidance Clinic Gives Free Mental Care

AN "ADULT GUIDANCE" clinic has been established experimentally in Worcester, Mass.

There troubled men and women can tell of their fears, worries, family disharmony, obsessions, the tyranny of alcoholism, or the tragedy of epileptic seizures. There they receive advice and treatment.

In this clinic, Dr. James Watson, of Worcester State Hospital, suggests in the journal *Mental Hygiene*, may be repeated the successes of the child guidance clinics. Mental diseases can be prevented. The adult guidance clinic is intended to provide the ounce of prevention.

Since the clientele of the clinic is limited to those who cannot afford to pay a physician specialist, economic distress is the shadow in the background of many of the patients' difficulties.

Doubts, the feeling of being handicapped, sensitiveness to the situation of being compelled to accept charity, discouragement—these fill their minds.

Many do not need mental treatment. But they are not hurried away. Their troubles are considered important enough for thorough discussion. Physical examination and treatment are provided for those in need of them. When the aid of other community resources is needed, these are obtained.

Mental treatment is, of course, freely dispensed, along with friendly counsel and a helping hand.

Science News Letter, November 25, 1939

PHYSIOLOGY

Sulfanilamide Compound Found Useful as Stain

SULFANILAMIDE compounds, used in the war against disease on a score of fronts, promise to be useful also in the scientific study of the undiseased tissues of animals and plants. It has been found to be an effective "vital stain" by Dr. Walter Carter of the University of Hawaii (*Science*, Oct. 27).

Vital stains are dyes used on living tissues, which they color up and thus make easier to examine under the microscope. The sulfanilamide compound used by Dr. Carter, known under the trade name of Neoprontosil, tinges the cells of plants and insects red. He made the discovery incidentally, while investigating possible effects on virus diseases.

Science News Letter, November 25, 1939

ASTRONOMY

Christmas Stars

Bright Heralds in the Evening Skies Are Four Planets Venus, Mars, Jupiter and Saturn Seen Soon After Sunset

By JAMES STOKLEY

AS if it were a sign in the sky to herald the Christmas season, a brilliant display of planets can now be seen in the west soon after the sun sets. Three of them are indicated on the accompanying maps, where we see the heavens shown as they appear in the United States at about 10:00 o'clock on the evening of December 1, 9:00 o'clock on December 15 and 8:00 o'clock on the 31st. The other, Venus, sets before these hours, but it can easily be found in the west as soon as it is dark, for its brilliance exceeds that of any other star or planet.

Next to Venus, Jupiter is brightest, and stands in the figure of Pisces, the fishes, to the southwest. Considerably fainter, though brighter than most of the stars, and about the same brilliance, are Saturn and Mars. Mars is in Aquarius, the water carrier, to the west, while Saturn is also in Pisces, and to the south. Mercury, the remaining naked eye planet, is not visible in the evening, but for a few days about the 16th of December, it will appear low in the east about an hour before sunrise.

Southeast Has Display

The most brilliant stars now to be seen are in the southeast, surrounding the figure of Orion. This group, representing the warrior, can easily be identified by three stars in a row which form the man's belt. Above, and to the east are two stars, Betelgeuse the brighter and Bellatrix the fainter, which are his shoulders. Rigel, the bright star to the south of the belt, is in one of his feet.

Above Orion is Taurus, the bull, supposed to be charging on Orion. The red star Aldebaran, in a V-shaped group, is his eye. Still higher, in the shoulders of the animal, are the Pleiades, a group sometimes called the "seven sisters." Below Orion is Canis Major, the great dog, with the dog star, Sirius, the brightest in the night time sky. Low in the east is the lesser dog, Canis Minor, with a star called Procyon.

A little higher, and farther north, are Gemini, the twins, with stars named Castor and Pollux. Above them is Aur-

iga, the charioteer, in which we find the star called Capella.

Two other stars, of the astronomer's first magnitude, are indicated low in the northwest. They are the only ones remaining of the brilliant stars of summer. Deneb, in Cygnus, the swan, is at the top of a figure called the Northern Cross. Still lower, to the right, is Vega, in Lyra, the lyre.

The Great Dipper, part of the great bear, Ursa Major, has been in the poorest evening position during recent months, but it is now starting to climb into the northeast. The upper two stars of the dipper are the pointers, which indicate the direction of Polaris, the north star, in Ursa Minor, the lesser Bear. Above the north star is Cassiopeia, shaped like a letter W on the side.

Christmas Grouping

Returning to the planets, it is interesting to find that in December just before Christmas, they have an arrangement not very different from that which they had in the year 6 B. C., shortly before the birth of Christ. In some of the five American cities now provided with that remarkable invention, the Planetarium, it is possible at each Christmas time to see the skies as they appeared from Palestine at that remote date.

In February, 6 B. C., Jupiter, Saturn and Mars were close together, all in the constellation of Pisces, the fishes. Now Jupiter and Saturn are in Pisces, and Mars in the neighboring constellation of

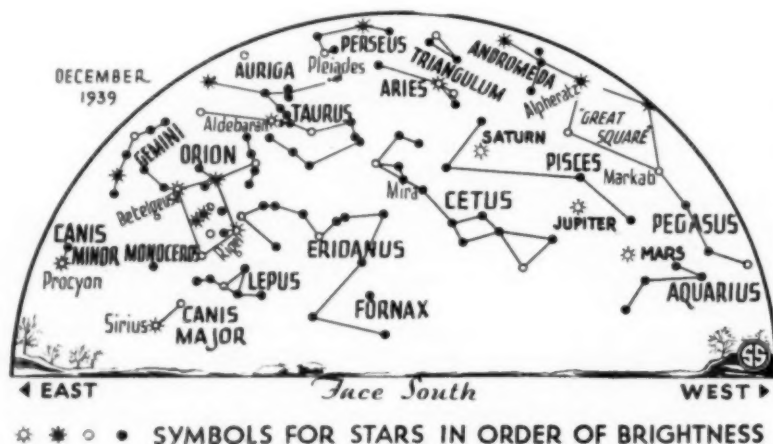
Aquarius, the water-carrier. There is another difference, for at that time, as the shepherds looked at them to the west, they saw Jupiter above, then Mars, and Saturn the lowest. Now Saturn is uppermost, Mars lowest and Jupiter between.

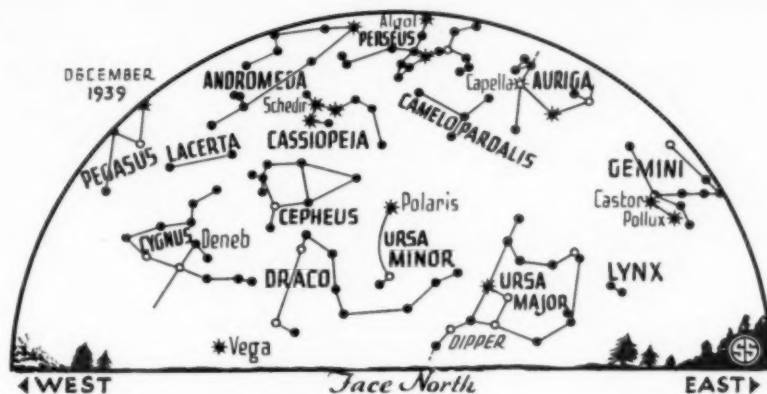
"Star of Bethlehem"

According to some authorities, this grouping of planets was the origin of the "Star of Bethlehem." The wise men of the east were really astrologers, holding the now thoroughly discredited idea that the position of the planets has an influence on our lives. According to them, Saturn was a planet particularly important to the destinies of the Hebrews. Also, they imagined, the constellation of Pisces was significant to the Jews. Then, when Saturn was joined in Pisces by Mars and Jupiter, they might well have imagined that this was a portent of some great event in Hebrew history, perhaps even of the arrival of their long-heralded King. So this might have been the sign they were awaiting, and after it appeared they may have set off on their long journey to Palestine to pay their homage.

One discrepancy seems to be that the Bible mentions that the wise men said they saw the star in the east, while the grouping of planets appeared in the west. Perhaps this is due to a mis-translation. Certainly the wise men were themselves to the east of Palestine, and if they went in the direction of the star they must have seen it in the west.

A clue is afforded by the French and German Bibles, in which words are used for "east" which definitely refer, not to





the eastern part of the sky, but the eastern part of the earth. So perhaps, instead of "We have seen His star in the east," the passage should be "We, in the east, have seen His star."

But the "Star of Bethlehem" may have been something else entirely. A so-called "new star," which is really an old star that suddenly gets much brighter, might have flashed out. An otherwise unrecorded comet may have moved across the sky. It might have been a fire-ball, a very brilliant meteor, similar to those which have been seen in broad daylight. And it might even have been some phenomenon so exceedingly rare that it has never occurred since. We have to admit that we really do not know what it was.

Science News Letter, November 25, 1939

Celestial Time Table for December

Sunday, Dec. 3, 2:00 a. m., Moon nearest earth, 230,100 miles distant; 3:20 p. m., Moon at last quarter. **Sunday, Dec. 10, 4:45 p. m.,** New moon. **Tuesday, Dec. 12, early**

a. m., Geminid meteor shower. **Saturday, Dec. 16,** 7:00 p. m., Mercury farthest west of sun, visible about now as morning star. **Sunday, Dec. 17,** 11:00 a. m., Moon farthest, 251,300 miles distant. **Monday, Dec. 18,** 4:35 a. m., Moon passes Mars; 4:04 p. m., Moon at first quarter. **Tuesday, Dec. 19,** 2:58 a. m., Moon passes Jupiter. **Thursday, Dec. 21,** 2:53 a. m., Moon passes Saturn. **Friday, Dec. 22,** 1:06 p. m., Sun farthest south—winter starts. **Tuesday, Dec. 26,** 6:28 a. m., Full moon. **Friday, Dec. 29,** 6:00 a. m., Moon nearest earth, 227,300 miles distant..

Eastern Standard Time throughout.

Science News Letter, November 25, 1939

ARCHAEOLOGY

Greek Athletes Good, But Not "Incredible"

MODERN athletes have been awed by the record hung up by one Phaullus, winner of ancient Pythian games at Delphi, who once jumped 55 "feet." The modern record for running broad jump set by Jesse Owens in 1935

is a mere 26 feet, 8¼ inches. Some commentators have frankly called the Phaullus jump incredible.

But now comes a report that ancient Greeks had no single standard for the length of a foot. M. Evangelos Kalfarentzos, Inspector-General of Physical Education at Athens, has been investigating sizes of stadia in Greek cities. Olympia's stadium was 600 "feet," actually 192.25 meters, he finds. A foot there measured about 12.7 inches. Delphi's stadium was 1,000 "feet" long, actually 177.55 meters, and a foot at Delphi was not quite seven inches.

Chionis, who won at Olympia in 664 B. C., jumped 23 feet, 1 inch, by this reckoning, not 52 feet as sometimes calculated. The jump by Phaullus at Delphi shrinks to 32 feet.

Even 32 feet is beyond modern free jumping records. But some say that the Greeks used a slightly raised take-off. And some point to evidence in vase paintings that jumpers increased momentum by swinging weights and casting them aside as they leaped.

Science News Letter, November 25, 1939

● RADIO ●

S. D. Kirkpatrick, editor of Chemical and Metallurgical Engineering and **Frank A. Howard**, president of Standard Oil Development Corporation, which receives this year's award for chemical and engineering achievement, will be guest scientists on "Adventures in Science" with **Watson Davis**, director of Science Service, over the coast to coast network of the Columbia Broadcasting System, Monday, December 4, 4:30 p.m., EST, 3:30 CST, 2:30 MST, 1:30 PST. Listen in on your local station. Listen in each Monday.

A New Chart on Classification of Animals for Teachers and Students

CLASSIFICATION OF ANIMALS (KINGDOM ANIMALIA)

CLASSIFICATION OF ANIMALS (TRIPLOID ANIMALS)

SUBKINGDOMS	PHYLA	SUBPHYLA	CLASSES	SUBCLASSES	ORDERS
PROTOZOA <i>One celled</i>	<ul style="list-style-type: none"> Protozoa 	<ul style="list-style-type: none"> Protozoa 	Paramecium	<ul style="list-style-type: none"> Paramecium 	<ul style="list-style-type: none"> Paramecium
			Amoeba	<ul style="list-style-type: none"> Amoeba 	<ul style="list-style-type: none"> Amoeba
			Dictyostelium	<ul style="list-style-type: none"> Dictyostelium 	<ul style="list-style-type: none"> Dictyostelium
			Plasmodium	<ul style="list-style-type: none"> Plasmodium 	<ul style="list-style-type: none"> Plasmodium
			Trypanosoma	<ul style="list-style-type: none"> Trypanosoma 	<ul style="list-style-type: none"> Trypanosoma
			Leishmania	<ul style="list-style-type: none"> Leishmania 	<ul style="list-style-type: none"> Leishmania
			Giardia	<ul style="list-style-type: none"> Giardia 	<ul style="list-style-type: none"> Giardia
			Cryptosporidium	<ul style="list-style-type: none"> Cryptosporidium 	<ul style="list-style-type: none"> Cryptosporidium
			Toxoplasma	<ul style="list-style-type: none"> Toxoplasma 	<ul style="list-style-type: none"> Toxoplasma
			Microsporidium	<ul style="list-style-type: none"> Microsporidium 	<ul style="list-style-type: none"> Microsporidium
METAZOA <i>Many celled</i>	<ul style="list-style-type: none"> Metazoa 	<ul style="list-style-type: none"> Metazoa 	Hydra	<ul style="list-style-type: none"> Hydra 	<ul style="list-style-type: none"> Hydra
			Planaria	<ul style="list-style-type: none"> Planaria 	<ul style="list-style-type: none"> Planaria
			Polychaeta	<ul style="list-style-type: none"> Polychaeta 	<ul style="list-style-type: none"> Polychaeta
			Arthropoda	<ul style="list-style-type: none"> Arthropoda 	<ul style="list-style-type: none"> Arthropoda
			Mollusca	<ul style="list-style-type: none"> Mollusca 	<ul style="list-style-type: none"> Mollusca
			Echinodermata	<ul style="list-style-type: none"> Echinodermata 	<ul style="list-style-type: none"> Echinodermata
			Cnidaria	<ul style="list-style-type: none"> Cnidaria 	<ul style="list-style-type: none"> Cnidaria
			Chordata	<ul style="list-style-type: none"> Chordata 	<ul style="list-style-type: none"> Chordata
			Vertebrata	<ul style="list-style-type: none"> Vertebrata 	<ul style="list-style-type: none"> Vertebrata
			Mammalia	<ul style="list-style-type: none"> Mammalia 	<ul style="list-style-type: none"> Mammalia

MB1 Wall size chart, 64 x 86 inches. Handmounted on cloth with wood rollers at top and bottom.....\$7.50

MB1r Student size chart, 17 x 22 inches. May be carried in brief case or pocket. Priced lower in quantities. Each **\$0.35**

Published and Sold by

5235 Ravenswood Avenue

Denoyer-Geppert Company

Chicago, Illinois

BACTERIOLOGY

Babies Are Protected From Germs in Hospital Nurseries

Infants Are Kept Safe By Ultraviolet Curtains and Isolation; Animals and Plants Are Grown Germ-Free

PROTECTION for babies in maternity hospitals and infants' homes, from the germs they unwittingly give each other, was a leading topic in a two-day colloquium on newest progress in bacteriology at the University of Notre Dame.

Two principal systems to obtain this protection have been developed. In one, brought to its highest point by Prof. James A. Reyniers of Notre Dame, emphasis is placed on complete isolation of all babies, brought about by keeping each one in a tiny room or cubicle, kept as germ-free as all imaginable precautions will insure.

The other system, developed by Prof. William F. Wells of the University of Pennsylvania, depends on floods of ultraviolet radiation across doorways and other critical areas in the hospital, which massacre the germs as they float through the air. Both systems are now under full-scale practical test at a well-known home for babies.

Life Without Germs

Animals and plants brought into the world without the contamination of germs, which is the fate of all ordinary living things, and kept germ-free throughout their lives, have been produced in Prof. Reyniers' laboratory, and adaptations of his technique, as well as other methods, are now in use by a number of research workers.

In Prof. Reyniers' method, the young guinea pigs or other laboratory animals

are born by Caesarian operation under completely aseptic conditions, within big tank-like cages where they are kept as long as necessary, receiving only sterile food, water and air. He has brought up guinea pigs, chickens and other animals from infancy to full growth, without their ever being invaded by a single discoverable germ.

Getting germ-free plants is usually a simpler job, Dr. Philip R. White of the Rockefeller Institute laboratories at Princeton, N. J., told his fellow-scientists.

Plants' internal tissues are usually naturally germ-free; it is a question simply of getting seeds out of a pod, or cutting tissues out of the inside of a stem or root, without their becoming contaminated. Many kinds of seeds have coats so resistant that they can be washed in effective antiseptic solutions without injuring the embryo plants which they contain.

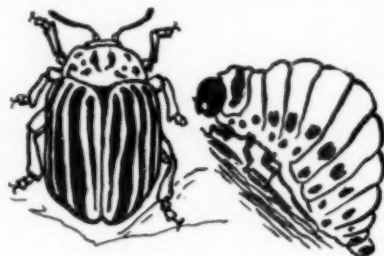
Dr. White described the method by which he obtains germ-free cuttings of roots, which he grows in flasks of nutrient fluid, maintaining them indefinitely without connection with any stems. In such cultures of non-green plant tissues he has proved that a little iron is as necessary to them as it is to the chlorophyll-containing leaves and green shoots. One part of iron in 10,000,000 of solution makes all the difference between life and death to simple tissues.

Other uses of germ-free techniques were set forth by Dr. R. W. Glaser of the Rockefeller Institute, and by Dr. Oram Woolpert of Ohio State University.

Germs One by One

Also discussed at the colloquium were exceedingly delicate mechanical devices, which make it possible to insert a single germ, or a germ-size dose of a drug or virus, into a single living cell, to study results on this smallest of all experimental bases. Applications of these techniques have been made to many practical problems in diseased conditions of plant and animal cells, as well as to cells in normal states of life and growth.

Science News Letter, November 25, 1939



Permanent Invasions

PESTILENCE, coming in war's train, has long been known and dreaded; St. John depicts it most dramatically as one of the Four Horsemen of the Apocalypse. To man's fields and gardens, no less than to man himself, war may bring plagues and pests. It has been so in the past, and may be expected to be so again in the future.

The War of 1914-18 took the potato beetle to Europe, where it had not been known before. Now it is a recognized menace to the food economy, especially of Germany. During the same war a devastating fungus disease appeared, no one knows whence, among the elms of the Netherlands, and has since crossed the Atlantic to threaten the elms of America.

Modern nations normally maintain careful quarantines, that are really quite successful in keeping out such undesirable immigrants. However, war-time pressure and hurry may cause temporary but costly relaxations and oversights—as in the case of the potato beetle already mentioned.

We have in this country numerous insect pests, both native and Asiatic, that have not yet reached Europe. Conspicuous examples are: boll weevil, chinch bug, Mexican bean beetle, Japanese beetle and tent caterpillar. Which of these will be the next to set unwelcome feet on European soil?

Science News Letter, November 25, 1939

Weather reports, important in military and naval strategy, are being withheld even by Formosa and Indo-China.

Giraffes were part of the war tribute paid to the Egyptian Pharaoh Tutankhamen by Nubians.

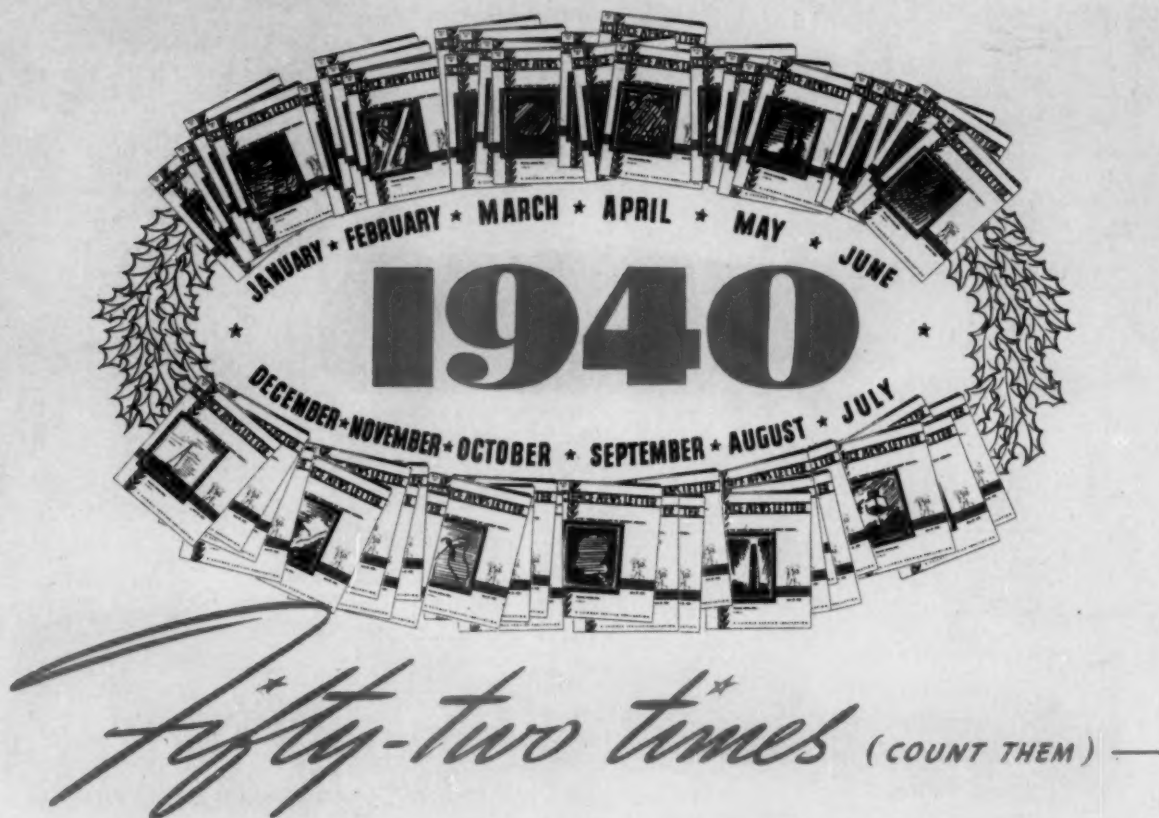
LANGUAGES

LINGUAPHONE

Thousands of men and women, in spare moments at home, have found the quick, easy way to master a foreign language—by the world-famous LINGUAPHONE METHOD. Amazingly simple and thorough. Do you wish to speak French, Spanish, German, Italian or any of 27 languages?

SEND FOR FREE BOOK

LINGUAPHONE INSTITUTE
31 R.C.A. Building New York



ONCE EVERY WEEK DURING 1940

YOUR GIFT CAN COME

to the Friends and Relatives of your choice

EVERY CHRISTMAS since 1922, more of our subscribers have presented *Science News Letter* subscriptions as Christmas Gifts. You as a subscriber know the kind of magazine it is. You as a subscriber know therefore just which friends and relatives it will appeal to.

From what is told us, we learn that *business men and women* read *Science News Letter* for ideas that may some day affect their progress—they want to know about **NEW** things ahead of the crowd! *Teachers* read it for new things to tell their students. *Parents* read it to get ahead of their children at least once in a while! *Club members*

read it for source material. *Engineers* read it because as precisionists they know that its articles are accurate. *Scientists and professional men and women* read it because it brings them a weekly view of other fields of science than their own.

To whom would you like to give *Science News Letter*, this Christmas? The Special Christmas Gift Rates are: **ONE** 1-year subscription, \$5—**TWO** 1-year subscriptions, one of which may be your own renewal, \$3.50 each. **ADDITIONAL** subscriptions above two, \$3.50 each.

No extra charge for postage to anywhere in the world.

Please use the form on the other side of this page in sending your Gift Subscription order to
Science Service at Washington, D. C.

**This CHRISTMAS ORDER FORM is for your convenience
in accepting the offer on the other side of this page:**

Date _____ 1939

To **WATSON DAVIS, Director**
SCIENCE SERVICE

2101 Constitution Avenue
Washington, D. C.

Please send SCIENCE NEWS LETTER every week in 1940 at the Special Christmas Gift Rates as shown below, and bill me for it on January 2, 1940
(or on _____ 1940):
(DATE IN JANUARY)

ENTER A ONE-YEAR SUBSCRIPTION FOR:

Name _____



Street Address _____

City and State _____

Send Gift Letter? _____
(SEE BELOW)

ENTER A ONE-YEAR SUBSCRIPTION FOR:

Name _____



Street Address _____

City and State _____

Send Gift Letter? _____
(SEE BELOW)

☐ Check here, please, to renew your own subscription at this special rate.

ORDERED BY:

MY NAME _____

Street Address _____

City and State _____

SPECIAL CHRISTMAS GIFT RATES:

ONE 1-year subscription, \$5—TWO 1-year subscriptions, one of which may be your own renewal, \$3.50 each. ADDITIONAL subscriptions above two, \$3.50 each. No extra charge for postage to anywhere in the world.

Text of individually typewritten, personally signed letter the Director will be glad to send in your behalf:

"It is my holiday happiness to write you that (your name) sends you, with his (her) Christmas Greetings, a subscription to Science News Letter. We of the staff will do our best to continue to merit the compliment (your name) pays this weekly letter on science by giving it to you."

GENERAL SCIENCE

New World Federation Foreseen After War

AFTER the war, what?

When and if aggression is curbed, when and if exhausted, war-torn peoples go back to peaceful life, the problems of a disordered world will be far from solved.

Even in the midst of nations at war, scientists and others are giving much attention to the future task of making a peace that will be likely to endure. In this country the urgency for action by scientists is less acute, but plans are underway and ideas are being put forth and explored. Particularly a real effort is in the making to cement together the scientific resources and progress of all the American republics.

Only secondary in importance to the fighting of the war itself is the preparation for war's aftermath of innumerable social and economic problems, foreseen by the leading British science journal, *Nature*. The penalty for failure to solve these post-war problems is seen as the collapse of civilization.

"There can be no more peace or safety on earth without a profound reconstruction of the methods of human living," H. G. Wells has said. This sentiment is obtaining support among scientists, the British especially. The world is seen moving toward a collectivism of some sort, a league or federation.

Lest civilization crumble away, it is urged that there must be a genuine attempt to realize world-wide plenty and safety through a federation of mankind. Free and unfettered discussion, simple and sincere, would be necessary to determine how this might be obtained. This is perhaps mankind's most essential job for the future.

Science News Letter, November 25, 1939

GENERAL SCIENCE

Manifesto Proposes New International Order

IN AN England at war, scientists have been doing some faster and harder thinking on the state of the world, during and after the present war. A manifesto signed by some 57 members of the Royal Society, among them Sir Richard Gregory, Prof. Lancelot Hogben, Sir John Orr, Prof. A. J. Clark, Sir Peter Chalmers Mitchell, and the Bishop of Birmingham, points out that the "progress of science and its application to human well-being are threatened by the prevailing anarchy of interna-

tional relations." (*Nature*, October 21.)

A new international order, going far beyond the League of Nations in its claims on individual nations, is advocated. At the end of the war all nations prepared to renounce war between themselves would unite under a federal

government, which would have power to use armed force against aggression, control raw materials of undeveloped territories, undertake the education of backward communities without racial discrimination.

Science News Letter, November 25, 1939

GENERAL SCIENCE

British Scientists Will Not Be Wasted in This War

Research Workers Considered in Reserved Occupations And Will Not Be Permitted To Sacrifice Themselves

By DR. VICTOR COFMAN

Science Service London Correspondent

B RITISH scientists have been indexed and classified, but not regimented.

A voluntary register, containing upward of 80,000 names, has been prepared, giving qualifications and type of work for which the specialists are best fitted.

This register was begun by the Royal Society and by various scientific and technical associations and has now been taken over and amplified by the National Service Department of the Ministry of Labour. It is available to the War Department who notify their requirements for trained personnel to appropriate Committees in charge of the register. Industrialists in need of specially trained men can also apply.

"British science is in a very much stronger position now than in 1914, especially as regards the number of trained men," Prof. J. C. Philip, told me. He is acting head of the Imperial College of Science and Technology of the University of London and chairman of the Industrial Chemistry Section of the Central Register of Scientists.

Although there is a surplus over present requirements, nevertheless the government has decided not to repeat the mistake of 1914 when brilliant young scientists were allowed to join the fighting forces indiscriminately. Physicists still remember with regret the loss of Moseley, whose brilliant career in X-ray research was cut short at Gallipoli.

Scientists and research workers are considered to be in reserved occupations and those not engaged in war work may continue their usual activities. At the same time, while full freedom is allowed to the individual, steps have been taken to inform research workers of the type of urgent problems that await solution. Some of these are of long duration, others have arisen since the war.

The "blackout" has called for scientific development. For instance, more effective phosphorescent substances were needed for use in underground shelters. Suitable "light filters" that would allow daylight in while preventing artificial light from passing outwards are being sought. Similarly gasoline restrictions make important devices for increasing miles per gallon, and alternative types of fuel are being exploited.

The Chemical Society has formed an advisory Research Council under the chairmanship of Sir Robert Robinson, to advise research workers in universities and other research institutions concerning general war problems needing investigation.

Another set of problems, which for the time being are left to the initiative of unofficial groups like Political and Economic Planning and the Engineers' Study Group, are those likely to arise at the end of the war. Large surplus capacity for the production of light metals, explosives, etc., will exist at the end of

the war, and this, as well as the workers engaged in those industries, will have to find other utilization.

British industry has at present a considerable reserve of trained personnel in the German, Austrian and Czech scientists who have sought refuge in Great Britain. They have so far been employed in their particular lines of work only to a slight extent.

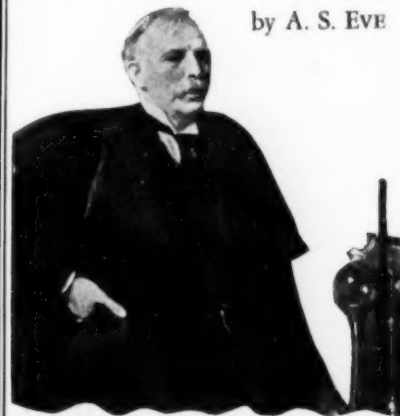
During the last war it was a "non-Aryan" chemist, Dr. Fritz Haber, who enabled Germany to fight a prolonged war by his development of a synthetic process for the manufacturing of ammonia and nitrates, essential in the manufacture of explosives. Haber died in Switzerland, an exile from Nazi Germany. The Nazis will miss the many other Habers they have sent into exile, when faced with inevitable shortage.

Have scientists any surprises in store in the present war? Faced with this question, Prof. Philip smiled and replied: "It is not a question that I could very well answer; however, this much I can say: during the last war it was the chemist who produced some of the most unpleasant innovations, such as the use of the poison gases. It may be the physicists' turn now."

Science News Letter, November 25, 1939

Just published RUTHERFORD

by A. S. EVE



The life story of a great scientist

This authorised biography tells of Rutherford's humble beginnings, his early experiments, and his great and triumphant discoveries.

At bookstores \$5.00

THE MACMILLAN COMPANY

● Earth Trembles

Information collected by Science Service from seismological observatories resulted in the location by the U. S. Coast and Geodetic Survey of the following preliminary epicenter:

Monday, November 13, 2:45.8 a.m., EST

Near Lake Cushman, in Washington, southwest of Mt. Ellinor. Latitude, 47 degrees, 33 minutes north. Longitude, 123 degrees, 16 minutes west.

Tuesday, November 14, 9:53.8 p.m. EST

In New Jersey, 15 miles southeast of Wilmington, Del. Latitude 39 degrees, 45 minutes north. Longitude, 75 degrees, 18 minutes west.

For stations cooperating with Science Service, the Coast and Geodetic Survey, and the Jesuit Seismological Association in reporting earthquakes recorded on their seismographs, see SNL, Oct. 28.

• First Glances at New Books

Geography

ALASKA, Its History, Resources, Geography, and Government—Mariette Shaw Pilgrim—*Caxton*, 296 p., \$3. Written particularly for school children in upper grades in Alaska, to teach them essential facts about their territory, this book will interest others who want the same basic material on Alaska. The author is a former principal in an Alaskan city school.

Science News Letter, November 25, 1939

Geography

THE LURE OF ALASKA—Harry A. Franck—*Stokes*, 306 p., \$3.50. An experienced travel writer tells of his Alaskan wanderings and sight-seeings, presenting a great deal of fact information in a very pleasant form. Any one planning a visit to Alaska may find useful suggestions here, also.

Science News Letter, November 25, 1939

Anthropology

ANTHROPOLOGY AND RELIGION—Peter Henry Buck—*Yale Univ. Press*, 96 p., \$1.50. The birth, growth, and decay of Polynesian religion is the subject chosen by Dr. Buck, director of the Bernice P. Bishop Museum in Honolulu, for this group of Terry Lectures. The Terry Lectures at Yale deal with "religion in the light of science and philosophy."

Science News Letter, November 25, 1939

Geography

NORTH AGAIN FOR GOLD, Birth of Canada's Arctic Empire—Edgar Laytha—*Stokes*, 360 p., \$3. A news correspondent who has found some vigorous and exciting pioneering being done in the Canadian North tells about it. A new "mineral empire" is being developed up there, and new types of prospectors and settlers are taking part in this latest frontier adventure.

Science News Letter, November 25, 1939

Botany

SUPPLEMENT TO ROOT NODULE BACTERIA AND LEGUMINOUS PLANTS—Edwin Broun Fred, Ira Lawrence Baldwin and Elizabeth McCoy—*Univ. of Wisconsin Press*, 40 p., 50c. A bibliography of the literature in this important field, covering the period 1932-1938.

Science News Letter, November 25, 1939

Anthropology

NOTES ON THE HUNTING ECONOMY OF THE ABITIBI INDIANS—William H. Jenkins—*Catholic Univ. of America*, 31 p., 60c. (Anthropological Series, No. 9.)

Accounts of the ingenious traps used by a northern Indian tribe, of the equally ingenious magic employed to induce animals to enter them, and of the uses made of the captures.

Science News Letter, November 25, 1939

Geophysics

TRANSACTIONS OF THE AMERICAN GEOPHYSICAL UNION, 1939—*National Research Council*, 740 p., Vol. I, \$1.25, Vol. II, \$1, Vol. III, \$1.75, Vol. IV, \$1.75, set, \$5. A great deal of important data, not available elsewhere, is preserved in these reports.

Science News Letter, November 25, 1939

Zoology—Anatomy

ATLAS AND DISSECTION GUIDE FOR THE STUDY OF THE ANATOMY OF DOMESTIC ANIMALS—H. L. Foust—*Collegiate Press*, 27 pl., \$1.75. Although intended primarily for classes in veterinary medicine, this manual is worth having in any zoology laboratory because of the excellence of its illustrations.

Science News Letter, November 25, 1939

Paleontology

THE PTARMIGANIA STRATA OF THE NORTHERN WASATCH MOUNTAINS—Charles Elmer Resser—*Smithsonian Inst.*, 72 p., 50c. (Smithsonian Misc. Coll., Vol. 98, No. 24)

Science News Letter, November 25, 1939

Anthropology

THE APINAYÉ—Curt Nimuendajú—*Catholic Univ. of America*, 189 p., \$2.50 (Anthropological Series, No. 8). Translated by Dr. Robert H. Lowie, this study deals with the social organization of a little-known Brazilian Indian tribe.

Science News Letter, November 25, 1939

Ornithology

THE PRIVATE LIVES OF BIRDS—Henry Smith Williams—*McBride*, 270 p., \$3. Records of understanding and sympathetic observations of bird-ways, with many good illustrations, partly in color. A good gift book, if you number a bird-lover among your acquaintance.

Science News Letter, November 25, 1939

Malacology

FIELDBOOK OF ILLINOIS LAND SNAILS—Frank Collins Baker—*Illinois Natural History Survey Division*, 166 p., \$1. Collectors who "just want interesting shells" and animal ecologists who are interested in problems of distribution will alike find this handy manual of value.

Science News Letter, November 25, 1939

History

A HISTORY OF WESTERN CIVILIZATION, From Ancient Greece Through the Renaissance, Vol. I—Arthur P. Watts—*Prentice-Hall*, 786 p., \$5. A well-rounded history text, starting with the Greeks and following through to the end of the Renaissance, where presumably volume two will take up the theme. With the world feeling very analytic over civilization, this type of book is likely to attract not merely students but also a sizable section of the general public.

Science News Letter, November 25, 1939

History

FOUNDATIONS OF WESTERN CIVILIZATION—William J. Bossenbrook and Rolf Johannesen—*Heath*, 695 p., \$3.75. What lies back of modern civilization—the forces, and the inherited and created activities which successive civilizations have experienced—is the dynamic theme of this timely history. The cultural phases are especially well illustrated on picture pages.

Science News Letter, November 25, 1939

Psychology

WORDS THAT WON THE WAR, The Story of the Committee on Public Information, 1917-1919—James R. Mock and Cedric Larson—*Princeton Univ. Press*, 372 p., \$3.75. See page 340.

Science News Letter, November 25, 1939

Psychology

THE INTEGRATION OF THE PERSONALITY—Carl G. Jung—*Farrar and Rinehart*, 313 p., \$3. See page 345.

Science News Letter, November 25, 1939

Agriculture—Geography

AGRICULTURAL ATLAS OF SWEDEN—Olof Jonasson, Ernst Höijer and Thure Björkman—*Bonnier*, 176 p., \$1.50. Everybody is interested in Sweden, as one of the most highly civilized and really successful nations in the world. Despite limited area and soils that are frequently poor, Swedish agriculture stands on a par with Swedish industry. This compact book, telling how it was accomplished, will command a keenly attentive audience.

Science News Letter, November 25, 1939

Biology

FIELD GUIDE TO LOWER AQUARIUM ANIMALS—Edward T. Boardman—*Cranbrook Inst. of Science*, 186 p., \$1.50, cloth, \$1, paper. Useful alike to beginning classes in hydrobiology and to the field naturalist working "on his own".

Science News Letter, November 25, 1939